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Protection and Promotion World

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Brand© is published 10 times a year. Each issue includes consultancy-level news and exclusive analysis on a variety of disruptive, emerging technologies that are gradually being incorporated by the world's leading brands.

Printed code tested in drug trial

A leading pharmaceutical company in the US will trial a nano-encryption technology that will verify and trace pills in 2010.

NanoGuardian, a business unit of Illinois-based taggant developer NanoInk, will supply the pharmaceutical brand with its encryption system and is planning to set up more trials in the following months.

Dean Hart, NanoInk's VP of commercial operations, expects to coordinate trial roll outs on several drug brands by the end of 2009.

Nanocodes developed by NanoGuardian are deposited directly onto tablets, capsules and vial caps during the packaging process. The codes can reference large volumes of manufacturer data, including product information, dose strength, expiration date, the systems

used in manufacturing, the location, and date of production, batch and lot number, as well as the country it was made in and the identity of the distributor and wholesaler.

The codes will also be linked to RFID tags and 2-D barcodes to form a multi-layered system which is able to monitor a drug from the manufacturing site to the pharmacy.

NanoGuardian supplies the readers and scanners that can detect codes. Hart says: 'We have also developed a closed loop auditing programme which allows proactive audits of the supply chain at pharmacy level.'

NanoGuardian has partnered with market research firms specialising in product surveillance solutions and is now in the process of confirming a handful of collaborations.

The security partner will send encrypted drugs to NanoGuardian's R&D centre to be instantly authenticated.

'If a pill or pack is without a NanoEncryption there is a 99.8% chance they are counterfeit. As the manufacturer can encrypt additional information, such as, point of distribution, dosage strength and expiration dates, there are likely to be discrepancies that will point to diversion issues,' says Hart.

Because NanoEncryption is non-destructive it can provide forensic evidence and allow the manufacturer to go back to a pharmacy and understand how the diverted product arrived, who delivered it and when. This enables a stronger line of communication throughout the pharmaceutical supply chain.

Hart believes NanoGuardian is creating a system that will encourage other brand owners in the industry to integrate serialisation anti-counterfeit models. However, he says a fully scalable system stretching across the whole industry is at least 8-10 years away as full implementation across the pharma supply chain will require high levels of participation and investment from equipment and IT companies.

Vineyard releases DNA protected wine

Paumanok Vineyards in New York State, US will pilot a DNA marker technology on the labels of its Merlot Tuthills Lane wine in 2009.

The vineyard is testing the markers on three of its premium wines.

A sample of its Riesling selection incorporated the technology in mid-June 2009 and the Merlot will be the second wine to trial the technology SigNature DNA, developed by US-based company Applied DNA Sciences (ADNAS).

Ink solutions developed by ADNAS contain unique nano-size botanical DNA codes that are applied at the label printing phase during the wine packaging and labelling process.

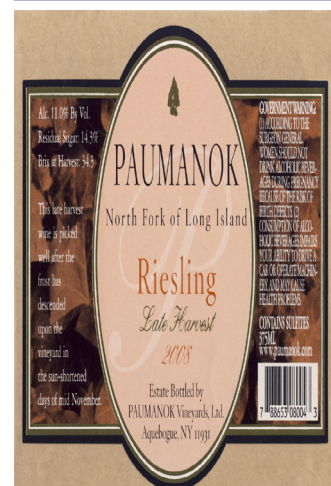
The codes cannot be removed or viewed without an ADNAS marker. Handheld readers can

NanoGuardian's code technology will be applied at pill level



Source: www.pharmaceutical-technology.com

ADNAS technology used on the Riesling label



Source: ADNAS

SigNature DNA fine wine security options



Source: www.adnas.com

scan the label at any stage of the development process.

Tony Woodward, a business consultant for ADANAS, says: 'The labels are printed and ready to go and product release is dependent on when the wine is ready, as Paumanok is working to its own commercial schedule.'

Woodward says roughly 350 cases of Paumanok's wine will be used to test the technology.

The third pilot will use a 2007 Petit Verdot Apollo Drive. This is a limited edition wine that will be launched using the ADNAS technology in 2010.

Charles Massoud, owner of Paumanok, says he is yet to encounter any fraudulent copying of his prize-winning wines but is becoming increasingly aware of the dangers it presents the industry.

'We selected the ADNAS SigNature DNA as we were convinced of its efficacy. It is unobtrusive: if you looked at the bottle there is nothing visible that is different from

our regular label. Other technologies seem to be more oriented towards theft prevention rather than fraud prevention,' explains Massoud.

Janice Meraglia, Applied DNA's director of communications at ADNAS, says: 'We hope there are no instances where items need to be verified, but it is good practice to use it as an insurance policy. Its value will kick in if there is concern about counterfeiting or the wine depreciates 10-fold and

becomes a collectors item being auctioned and bought in the secondary market.'

Hong Kong airport trials 2D barcodes and RFID

RFID standards advisor GS1 is running a product origin pilot in Hong Kong airport using 2-D barcodes.

A handful of retailers based in the departure lounges of Hong Kong airport are taking part. Duty-free specialist Nuance-Watson, health supplement supplier, Comvita, traditional Chinese ingredient supplier, First Edible Nest; and Po Sum On Medicine Factory, a manufacturer of Chinese medicine, will all integrate the hybrid system in Q3 2009.

Anna Lin, chief executive of GS1 Hong Kong says the PA solution is being deployed to protect Hong Kong's reputation as an international shopping capital. 'Taking into account the growing public

concern over food ingredients as well as the authenticity of healthcare products, we have selected these retailers as they each represent an area of the consumer market that faces counterfeit activity,' explains Lin.

Funded by the Hong Kong SAR Government, the Product Authentication (PA) 2D barcode solution will enable consumers to authenticate products online after purchase.

During the packing stage, barcode labels and serialised track-and-trace EPC/RFID tags are attached to each item that contain vital information.

The authentic barcode label is a 2-D data matrix barcode imprinted with a 15-digit VerCode hidden underneath. A unique VerCode is assigned to each product item to enable product identity verification.

The EPC/RFID tag recorded the critical points in the production line, from goods labeling, packing, picking to distribution at retail stores to enable product traceability.

'Before making a purchase, consumers can track selected critical points in the production line by scanning the RFID label on the product (at RFID smart kiosks located at the airport). After purchase, consumers can input the "VerCode" hidden under a label on the item to verify the authentication. This can be done directly by logging on to the BarcodePlus portal or by sending an SMS message,' continues Lin.

A product's shelf-life, country of origin, ingredients and

SigNature DNA used on a bottle of Riesling



Source: Paumanok

Interactive smart kiosks at Hong Kong airport



Source: www.gs1hk.org

packaging, through to images, certifications and testing reports issued by Hong Kong product testing and certification bodies can also be accessed by consumers.

RFID smart kiosks are located in Travelcare Express operated by Nuance-Watson and the First Edible Nest shop located in the airport.

Lin says the pilot is due to end in August 2009 and GS1 Hong Kong will first promote the solution among its 5,000 company members spanning 15 industry sectors, and commercialise the system worldwide in Q1 2010.

'Though Hong Kong is an attractive destination for tourists and shoppers, we have to strengthen our checks on product origin and distribution status. Brands want consumers to shop with confidence and this is where

the Product Authentication solution comes in, providing local consumers and tourists with a way to tell the difference between real items and fakes,' explains Lin.

Bosch Rexroth trials RFID to flag counterfeit equipment

German electrical and mechanical engineering firm Bosch Rexroth is using RFID tags to help its supply chain customers identify fake or stolen mechanical components.

Bosch Rexroth builds machines and pneumatic systems for the construction and automotive industry. The firm is conducting a pilot during Q3 in Germany to test if RFID can prevent essential components from counterfeiting, loss and theft.

The RFID tags will be tested on mechanical valves that are incorporated into industrial machinery. Rexroth's valves are used in driving, controlling and moving machinery used in industrial and factory automaton as well as mobile applications.

These are expensive and are sought after on the black and open market.

Gerhard Pfeifer, director of sales and marketing for the pneumatics business unit at Bosch Rexroth, says: 'We hope the technology will create a better understanding of how this department and potentially others can manage product inventory and ensure nothing goes missing.'

The tags will contain information on the properties of a valve. RFID will be integrated at item-level so each valve will be attached to a tag.

Antennas are attached to containers used to transport valves from the production line to Bosch Rexroth's distribution unit.

Data from the tags such as date of production, location and time will be stored on the chips embedded in the tag. All the information is evaluated by software via a serial data transfer system at Bosch Rexroth.

'The technology should prevent the wrong valves from being installed into machines and will also flag up any counterfeit equipment that has been sent to us. The best antidote for product piracy is innovation at the highest level that enables us to continue to set ourselves apart from the competition and rule out product copies,' says Pfeifer.

Counterfeit valves can cause process mishaps, downtime and serious accidents. The Nuclear Regulatory

Commission issued an alert to nuclear power plant operators in 2008 to warn against counterfeiting as three counterfeit valves were discovered in machines at two nuclear facilities in the US. One was installed as a cooling water pump discharge stop check valve while the other two were found in circuit breakers.

Olympic Games organisers apply multi-layered approach to ticket security

The Vancouver Organising Committee for the 2010 Olympic and Paralympic Winter Games (VANOC) says tickets will incorporate a range of anti-counterfeit technologies.

VANOC aims to sell the majority of its tickets online and aims to reiterate its non-counterfeit policy by advising consumers not to buy tickets from touts.

Tickets for both of the events – due to take place in 2010 – will contain a hologram that has the VANOC logo embedded on the front face. A new watermark device will be applied on the back and the ticket substrate will be made using a secure paper technology.

Caley Denton, VANOC's vice president of ticketing and consumer marketing, says micro printed codes and unique UV light-sensitive fibres will also be used in the ticket design.

'We can't divulge too much about the technology but we

RFID provides valve protection



Source: www.boschrexroth.com

Ticket images for the 2010 Winter Olympic Games



Source: CNW Group



will apply several applications to ensure these tickets are very difficult to copy.'

Using a handful of anti-counterfeit technologies together, in a multi-layered structure, ticket checks will be made quickly and accurately.

Denton says scanning using portable handheld readers will reveal where and how a ticket was purchased and if it's been stolen or lost. Denton explains: 'We are attacking this problem on multiple fronts. But the most important thing for people to know is that they can only buy tickets from an authorised vendor.'

RealCerti offers flexible online authentication

A communications company in South Korea called Dinnovan is launching an online authentication service named RealCerti.

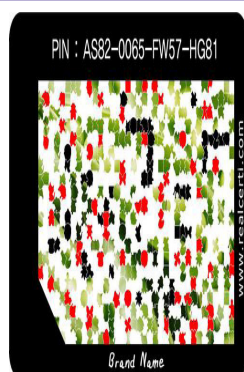
The technology is to be used

to protect luxury goods. Each item will have a certification card/tag attached to the packaging that contains an encrypted 16-digit alphanumeric hash code. A customised coded image can be created for each brand.

After purchasing a product, customers can verify origin and quality by entering the number on the RealCerti card into the RealCerti website, when it goes live later in the year.

There are several versions

The RealCerti ID card



Source: www.dinnovan.com

of a card that a brand owner can choose from. One format works on a cross reference between the digital code on the card and data stored on the RealCerti server. A second version measures contrasts between the resolutions of images.

The RealCerti ID certification solution encodes a PIN number, image of each product and reports any attempt to access authentication.

'The domestic and overseas markets do not have a similar solution and our international patent application is ready,' announces Cliff Lee, Dinnovan's sales division account manager.

Lee says RealCerti was developed in less than a month after the economic downturn started, as the company felt it was even more important for luxury goods manufacturers to protect themselves against counterfeiting.

Printed electronic codes trialled on fine Italian produce

A handful of high value wine and food producers in Italy are trialling a printed electronic code to protect their goods from theft and counterfeiting.

Imitations of parma and prosciutto ham, parmesan cheese, olive oil and wine are emerging and native producers are losing a significant amount of business. Fake or falsely labelled produce is sold

frequently on global auction sites.

This has encouraged several brand owners and producers in Italy to consider using efficient solutions to protect their goods.

Nicanti, a start-up in Finland, is developing a complete brand protection system that can be used across a range of markets.

Nano-encrypted (invisible) inks can be printed on the product itself, the price tag or the packaging.

The codes are scanned like a barcode using a handheld reader also developed by Nicanti to verify product origin and quality.

Paul Wilkinson, CEO of Nicanti, says: 'Demand for verification and traceability in the global food market is increasing dramatically. We have produced a complete system that can be tailored to the brand owner and will ensure the identity of its goods is maintained.'

Wilkinson says some countries are losing out to counterfeit foods more than others. Italy is well known for its high-end olive oil, cheeses and cured meats and fake versions are flooding the market rapidly through online auctioning, Wilkinson says Italy is an ideal region to launch the technology.

Italian brand owners and producers testing Nicanti's codes belong to a consortium of companies that are testing new technologies that can protect their produce, reputation and improve transparency in the supply chain.

Brand examines the growing use of RFID in the dairy industry, for better food security and other benefits

Pastures new

Monitoring the production and distribution of dairy products can be tricky. Goods such as milk, cheese, sour cream and butter perish rapidly and are easily damaged by alterations in temperature.

RFID poses an ideal solution for dairy farmers, distributors and retailers. It is now being used by a handful of companies to improve inventory operations, increase efficiency and real-time processes are suitable for replacing any existing manual or labour-intensive stock control methods.

According to research from the [Iowa State University College of Veterinary Medicine](#), in the US, electronic identification technology has been used in the dairy industry for more than 30 years. RFID was adopted to identify cows in milking parlours, sort gates and electronic feeds. Tags are still used in the same way, but as demands on dairy production have intensified there is a growing need for a more in-depth analysis of daily milk yield, storage and distribution.

Alan Sherman, director of marketing for US-based RFID solution provider, [OATSystems](#), says: 'Consider the flow of the supply chain. Products move from the farm to the processing facility, in to packaging operations, through distribution, and are eventually sent to supermarkets. In each of these steps, there are exchanges of information and goods requiring shipping notification, confirmation of receipt, inventory management, reusable asset tracking

and cold chain management. RFID can improve each of these processes and also work with existing systems to provide a full real-time insight into the movement of milk and cheese, without the need for manual processes that can cause delays and inaccuracy.'

Sherman says RFID will become a real asset to the dairy industry. 'By combining unique product location data, alongside real-time updates from temperature sensing tags, retailers and suppliers have clearer visibility over the supply chain. A real-time system protects producers from a loss of stock as violations in storage temperature on fresh items are flagged immediately.'

How are brand owners using RFID?

[Daisy Brand](#), a brand owner in the US which sells its sour cream and cottage cheese to global retailers such as Wal-Mart, is making real headway with RFID. Daisy was one of the first to commit to Wal-Mart's mandate in 2005 while other suppliers in the US hesitated.

The company is incorporating RFID tags supplied by leading RFID tag developer Alien Technology based in the US. The technology is used to monitor distribution, sales and the value of in-store promotions which provides a clearer understanding of consumer purchasing habits. Speaking exclusively to *Brand*, Victor Vega, Alien's director of marketing, says Daisy Brand initially installed RFID to improve compliance and create a stronger line of communication with Wal-Mart, rather than concentrate on ROI straight away. It transpired

RFID can improve each of these processes and also work with existing systems to provide a full real-time insight into the movement of milk and cheese

that Daisy Brand managed to gain ROI and achieve its initial ambition.

Vega explains: ‘Daisy was able to use RFID to extend its scope beyond compliance and inventory tracking, and discovered ROI through a clearer business insight into its dairy supply chain which has also improved customer satisfaction, and brand integrity.’

Daisy Brand is now integrating RFID tags at pallet-level and applying the technology in several of its distribution warehouses and factories. Alien’s Gen2 tags are attached to conventional dock door portal installations and forklifts. Handheld and fixed readers capture EPC data and instantly send it to Daisy’s mainframe inventory system.

‘Daisy’s installation is a good example of how RFID can improve real-time tracking of dairy products. Storing unique lot numbers, expiration dates and location information for each pallet has helped it categorise its stock and monitor its movement more closely. A tagged pallet indicates the different destinations of no-fat versus regular sour cream and sell-by date is also stored in the company’s central information server,’ explains Vega.

‘When a truck arrives to pick up a load, the system notifies the driver that the right product has been picked. For example, a pallet containing cases of cheese with an imminent sell-by date would not be shipped to a far-away retail destination. The reader at the portal will also alert a driver on his tablet PC if he is loading the wrong pallet for a specific truck.’

Vega says RFID technology (tags, readers, software) has evolved dramatically since Daisy Brand first initiated its integration efforts in 2005. ‘The technology’s performance, availability and reliability has improved significantly over time. Tags are now integrated with sensors and are more sophisticated than previous versions. The silicon chips that operate the tags and store data from the sensors are more advanced. The antennas have much longer read ranges than the older types, which means they offer much better performance on liquid goods, this is vital when distributing milk for example.’



Figure 1

Readers and tags provided by Alien technology in the Daisy Brand roll-out

Source: Alien Technology

Can RFID improve the entire dairy supply chain?

Dr Katina Michael, a senior lecturer at the School for Information Systems & Technology at the [University of Wollongong](#) in Australia, has conducted high-level research into RFID used in dairy farming. She says RFID doesn’t necessarily guarantee efficiency. ‘It depends on a company’s role in the supply chain, what region the produce comes from and how it is used in every day operations.’

She explains: ‘If a dairy farmer adopts RFID to meet a government mandate or industry-specific compliance directives then efficiency is likely to be pretty low to start with. Most Australian dairy farmers, for instance, have found the task of RFID tagging quite onerous in the main.’ RFID technology is still fairly young and initial use may be daunting for producers that have used traditional methods to distribute goods.

Michael says RFID will eventually benefit dairy farming in the end-to-end management of the dairy supply chain. ‘Other supply chain stakeholders besides the farmer, such as animal healthcare officials, veterinarians, livestock

Case study: Dairy Farmers of America

Dairy Farmers of America (DFA) is a cooperative of over 20,000 dairy farmers and one of the largest and most diversified US manufacturers of dairy products and ingredients.

Facing a Wal-Mart RFID initiative, the DFA was determined to find an RFID solution aligned with its vision for process efficiency and supply chain automation.

the DFA adopted OATSystems's tagsource system which provides an automated RFID tagging solution that allows the DFA to apply and verify EPC tags. Rush Tracking Systems, a Kansas based RFID integrator, was commissioned to deploy and integrate the tagsource solution into multiple production lines and plants.

DFA complies with its RFID requirements on time, and is frequently using EPC tags without increasing headcount and has seen few problems since going live. With performance confirmed, DFA has deployed automated tagging on a second production line – and has a flexible platform in place to handle future RFID initiatives from Wal-Mart and other retailers.

producers, sale yards, slaughterhouses and government agencies, can gain more knowledge as RFID can provide audit data and instant updates on the quality of the end product. Goods are now safer in transit and arrive fresh ready for consumption. For instance, milk volumes from each farmer can also be remotely monitored giving wholesalers and retailers a better idea on frequency volume of delivery.'

Technical challenges

Robert Hochberg, president and CEO of [Numeric Computer Systems](#), a provider of supply chain execution solutions in the US, says: 'Dairies have only used RFID when dictated to by key clients and have applied a makeshift "slap-and-ship" approach to fulfilling that need. The technology certainly is improving but the dairy and beverage industry continues to face real challenges since RFID can occasionally cease to work with liquids which absorb and block antenna frequencies.'

OATSystems has been working with distributors and producers in the dairy sector since 2005, and Sherman says that from automated tagging operations through to the most advanced inventory visibility processes, RFID is widely used.

'Read rates typically exceed 99% and are no longer an issue for discussion. Tag and hardware costs have fallen significantly, and software is easily deployed and configured to integrate with existing inventory and B2B systems to streamline operations and enhance profitability,' he adds.

Michael says tag durability is still a concern. From a retailer point of view, the sale of large volumes of goods rest on the accuracy and the performance of RFID tags. 'If a chip overheats or an antenna is damaged, a producer's business and reputation comes under scrutiny. Another issue was designing an accessible, 24/7 software system that was easy to use and understand for all parties involved in production, distribution and retail.'

How is RFID evolving in this sector?

Michael says a range of new RFID technologies is being researched for the dairy farming industry. 'We are seeing a trend that will offer better software support for farmers. This incorporates the use of secure wireless local area networks (WLAN) on the farm which are RFID compatible, reducing the need for cables, business-to-business portals.

RFID also protects brands from counterfeits and theft, and can limit the damaging effects of contaminated or poor quality goods. In 2008, three babies in China died and 53,000 children were taken ill from drinking milk products that contained an overdose of melamine, a toxic component that is used in packaging but can also boost the protein count in baby goods. Fortunately, further deaths have not occurred but this outlines the need for a secure and reliable RFID infrastructure that can prevent the spread of contaminated produce.

RFID has also been used as a testing device for milk products. Swiss-based, compliance and solutions developer [Foss Milkoscan](#) has developed an RFID reader that tests and traces samples back to source to reduce concerns over

compromised batches of product.

Despite a slow start to implementation, particularly in the US, Sherman says forward-thinking companies in the dairy industry are implementing RFID-based solutions, to help improve their operating margins and enhance bottom lines.

'The initial interest began years ago largely in response to retailer mandates, but now the growth in RFID is being fuelled by the proven value – it is no longer a question of the physics of RFID and how it works, but rather an investigation into how best to address the most critical business issues, and which ones to resolve first,' he adds.

'RFID deployments must be justified by a measurable and demonstrable ROI before any investment will be made; there is little doubt that RFID delivers tangible business value,' Sherman continues.

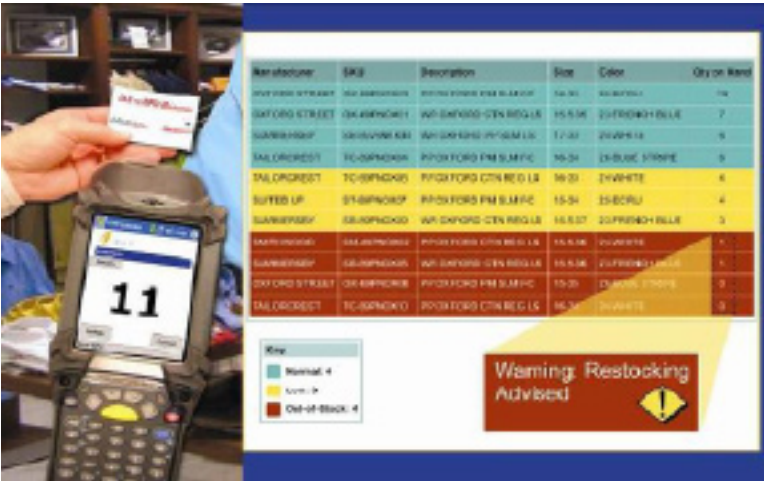
It is important for any dairy product owner to consider its operation and business needs, and identify the areas that could be enhanced by real-time insight and process improvement.

While electronic identification technology in the dairy industry is not a new phenomenon,

RFID roll-outs in the sector only started five years ago. There is room for improvement and further implementation problems are likely to emerge. However, the technology is spreading and companies such as Daisy Brand has been able to take its RFID deployment to a new phase, by using data analytics to improve promotions and high-volume shopping times.

Given the potential of RFID to protect and ensure the integrity of dairy products, and the ever-increasing mandates from retailers and governments for supply chain visibility, the technology is bound to speed from adolescence to full maturity ■

Figure 3
An RFID tag being scanned
and an inventory report
that can be generated.
The colour-coding indicates
stock levels, and a real-
time restock alert is being
issued for items that are
out-of-stock
Source: OATSystems



How is the aviation industry
implementing RFID?
Michael Dortch investigates

Take off?

The aviation industry is facing intense scrutiny. Fingers are being pointed at leading airline companies after a series of planes have plummeted into oceans, collided with other aircraft or have been forced to crash land. A hundred or so passengers have lost their lives in 2009 and the reputations of the airlines responsible are in tatters.

Three plane crashes over the last six months have been caused by faulty cabin controls, and old, worn out landing equipment and sensors that monitor speed and engine temperature.



Figure 1
Aircraft maintenance
Source: *Wired.com*

This represents an ideal opportunity for RFID technology to be introduced on a larger scale. RFID tags and smart labels pose a feasible and justified technology that could significantly improve and aid the checking and quality control of technical plane components. This would ensure worn out parts or electronics are identified before an aircraft is cleared for take-off.

RFID can also prevent the use of counterfeit parts. Leading firms such as Turkish Airways, AirFrance and AirSpain, (have all seen their planes break down while in flight because of part failure) must be re-thinking or disposing of existing supply chain management systems and introducing more accurate, real-time analysis. Companies developing RFID could see a dramatic increase in interest from suppliers in the aviation industry because there is a clear opportunity to apply RFID to check every component used on an aircraft. This is likely to be expensive to implement initially, but is surely a price worth paying as - under pressure - airlines need to protect what remains of their brand integrity.

The concept of RFID throughout the commercial aviation industry has been considered frequently over the last 6-8 years. Aircraft makers, part suppliers and operators are aware of the advantages, however, full-scale deployments are still few and far between.

Raman Boparai, supply chain specialist at [Air Canada](#), says: 'Air Canada has not adopted this technology because it's too expensive. If

Companies developing RFID could see increasing interest from this industry because there is a feasible reason to apply RFID to every component of an aircraft

Air Canada was to go ahead, we could reduce levels of lost and misplaced baggage and cargo. From a supply chain perspective we could reduce the costs of part inventory systems and increase speed of work, but in this climate the money isn't available and airlines don't want to take risks.'

Despite Boparaj's concerns, the cost of RFID is falling. **NEC Corp** plans to begin taking orders for RFID tags and readers. The Japanese firm claims the tags are almost 90% less expensive than commercial versions available in the market.

Cost is one of the first barriers for airlines and plane manufacturers to assess, but the integration process is also another barrier to widespread implementation. 'Even cheap prices like NEC's will not necessarily trigger a widespread adoption,' Mr Boparai cautioned. He adds: 'If RFID is to be used more widely, the whole of the aviation supply chain and communication network has to embrace it. There is no point in one airline using RFID if others aren't.'

David Wichner, a former airline employee and current aircraft industry analyst, says: 'Specific, tightly targeted business benefits can result in success with RFID, but the infrastructure is expensive.'

Wichner is an analyst for US consultancy firm **Booz Allen Hamilton**. 'Beyond costs, the biggest challenges to RFID include the applicability, readability, size and recycling issues regarding tags. Given these challenges, if you're in a process where you can train for overt scanning and achieve high repeatability, RFID loses some of its appeal because the technology is not ready.'

Don't believe the hype

Jon Andresen, president of Technology Solutions, LLC, spent 16 years at United Airline's maintenance base in San Francisco, US. He claims the technology is improving but expectations of performance have created unrealistic implementation targets. 'RFID is progressing for use in this industry, but the hype is moving far ahead of actual implementation.'

Andresen has developed a troubleshooting



Figure 2

David Wichner, associate
with Booz Allen Hamilton
Source: Booz Allen Hamilton

programme for the aviation industry called **Spec 2000** which he says presents a comprehensive analysis of how barcodes, RFID and other authentication technologies can be used by airlines, part manufacturers and airport staff. The programme is widely supported by members of the Air Transport Association of America (**ATA**) and was set up to overcome communication and logistics challenges that plague the industry's supply chain. A set of specifications and standards provide support for managing conventional barcodes, emerging 2-D barcode technology and RFID.

Meeting standards

According to a presentation given in October 2008 by Rahul Shah, managing director



Figure 3

Jon Andresen, president of
Technology Solutions, LLC
Source: Technology
Solutions LLC

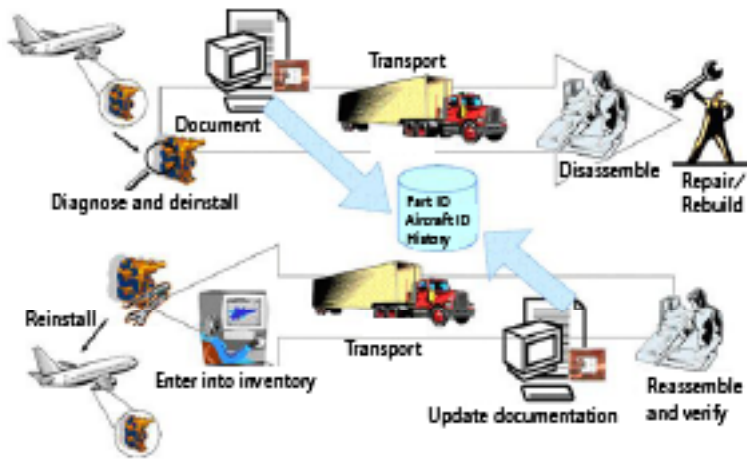


Figure 4

Diagram of RFID-enabled aircraft manufacture and repair

Source: Microsoft Developer Network

at AAR Corp, the ATA estimates that costs related to ‘no fault found’ (NFF) events range between \$150,000 (€107,000) and \$200,000 (€144,000) per aircraft per year. Avionics systems account for 75 % of NFF events, with pneumatic and hydraulic systems responsible for approximately 18% and 4%. Industry-wide, NFF events effect 25–30% of all aircraft avionics systems,’ Shah explains.

ARINC 672 is a proposed industry standard that aims to reduce NFF events by providing common terminology and processes for parts substitution and tracking across the lifecycle of each identified fault. The evolving initiative focuses primarily on improving supply chain communication and on documenting event sources and histories and relevant process and actions. RFID, barcodes and other tracking technologies are expected to contribute significantly to efforts aimed at improving communications among and within manufacturers and parts suppliers, and at providing detailed source and history information. (More information about ARINC 672 may be found online [here](#).)

Playing a part

Andresen and his colleagues involved in Spec 2000 also developed a sequence scheme that enabled further support of barcode and RFID technologies for aircraft parts tracking for the US military. ‘Each part has a permanent, unique identity, even if other identifiers change over time. We established the numbering format to give parts the equivalent of social security numbers,’ says Andresen.

Andresen says the US military generated the real driver to push the numbering sequence programme forward. The US Department of Defense (DoD) is using a Unique Identifier, based on Andresen’s concept, and is ensuring a range of parts used in its aircraft fleets meet a certain set of standards and are monitored as they are sent from base to base.

In 2007 the International Air Transport Association ([IATA](#)) published an opportunity analysis of RFID. The IATA represents 230 airlines accounting for 93% of all scheduled air traffic worldwide and used comment and analysis from a range of global supply chain managers to produce the report. A spokesperson for the IATA, says: ‘There are clearly benefits that could be made using the technology, and as new aircraft are introduced then the use of RFID will become more common. Airlines that are innovative and forward looking should examine these opportunities so that they can benefit from the technology as it is introduced over the next few years.’

The role of aircraft manufacturers

Beyond the analysis carried out by global airlines, leading aircraft manufacturers are helping to drive RFID adoption to new heights. According to Patrick J Sweeney, founder of US-based RFID solutions developer ODIN Technologies, part manufacturers are becoming more aware of the importance of RFID and how it can improve business systems and also ensure faulty parts aren’t used in aircrafts.

He says: ‘The scrutiny aimed at airline companies is trickling down into the aircraft production sector. Room for error is minimal and suppliers are taking RFID more seriously.’

ODIN Technology’s tool tracking solution

- Uses a combination of passive and active RFID
- Is a complete packaged solution that installs in less than two weeks in most instances
- Includes user training and system customisation for specific tasks
- Automates calibration time compliance by signalling at check-in and check-out
- Associates individuals with specific tools including date and time stamp
- Creates a work-area ‘virtual fence’ and notifies users if tools breach a perimeter

ODIN's technology is used by several leading aircraft manufacturing companies. He says global plane developer [Airbus](#) is galvanising its own supply chain and is working with its supplier base on 13 projects aimed at testing and trialling RFID. 'Our RFID technology is being used across several of Airbus's aircraft assemblies. It is being applied for maintenance, repair, overhaul and audit.'

The Airbus A380 aircraft has benefited from RFID and a part tracking system is in full swing as all of the docks at its central warehouse are enabled to track movement of parts onto the A380. Parts and components range in size and include peices of wings or fuselage assemblies.' ODIN has now installed more than 100 RFID tags and readers on the assembly line of the A380. 'The second phase of the deployment was driven by the end users who are reaping the advantages of RFID as it simplifies their business process and helps them get ahead of [their] work schedule. Now, the business lines are asking for the technology, rather than technology advocates lobbying business decision-makers,' explains Sweeney.

In addition, aircraft manufacturers are beginning to take advantage of RFID's technological evolution. An example is the user-accessible memory included on modern, Gen2 RFID chips. The smallest useful capacity is 512 bits, enough information to track life jackets, oxygen generators and smaller, cheaper things according to Andresen. However, newer tags with capacities of up to 64 kilobytes are increasingly demanded by more advanced users, and are beginning to be supplied by companies such as Fujitsu.

Moving forward

Despite recent progress and clear business benefit, Andresen predicts it will take at least another five years for RFID to take off. 'The technology is likely to be ready sooner than this but airlines are slow-moving and conservative. They are not having a great time businesswise as little money is being made and it seems they would rather sit back and wait for a competitor to go first,' he says.

Suppliers need to become more familiar with the technology so it could take a while before they are fully capable to use RFID across their



Figure 5

Airbus A380

Source: Airbus

entire product range. According to sources, Airbus and Boeing are increasingly writing requirements for RFID support into their purchasing specifications, however, which should accelerate and broaden adoption. Andresen says senior executives often still forget that they need to focus on solving a business problem before adopting any new technology. 'If they get excited by a technology and integrate it without a clear plan, it will fail. Especially if their business processes don't measure up. Unfortunately new technology helps mistakes occur faster, rather than make them go away' ■

Michael E. Dortch is principal analyst and managing editor of [DortchOnIT.com](#), 'an independent voice for technology-dependent people.' He can be reached at [www.DortchOnIT](#).

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